an unexpected result, as discussed above, the system, in some embodiments, may instigate default shutdown. Thus, the system would shutdown based on the "unexpected" CGM data. However, assume that the pump actually delivered 1 unit, rather than 2 units, and assume that the glucose data is consistent with a 1 unit delivery, then the CGM sensor has not produced an actual unexpected result, rather, it was a perceived unexpected result based on a lower than expected volume of insulin being delivered. Thus, the precise and accurate determination of the volume of insulin (or other medical fluid) delivered may provide a more accurate and safe controlled loop system for the delivery of medical fluid therapy.

[0513] Further, with respect to the various embodiments described herein using the AVS measurement sensor, the presence of occlusions, bubbles and an empty or partially empty reservoir may be determined quickly and accurately. Again, this provides for a more accurate determination of the actual volume of insulin delivered and, also, an accurate detection of an empty reservoir, an occlusion or a bubble. Thus, the AVS measurement sensor provides for a more safe and accurate controlled loop system for the delivery of medical fluid therapy. Further, determining the presence of an occlusion, bubble(s), or an empty or partially empty reservoir may be highly beneficial to the user's therapy and safety.

[0514] The precise determination of the volume of insulin delivered also effects the calibration of the system. Thus, having a precise measurement, the system may more accurately calibrate and thus, may determine unexpected results of integrity failure sooner.

[0515] Thus, various embodiments of the control loop include an actual volume and the trajectory volume. Where a system includes an actual volume that is closest to the trajectory volume, the estimate of plasma and ISG is closer to true. This may lead to more accurate insulin sensitivity determinations and calculations and more accurate predictive algorithms.

[0516] While the principles of the invention have been described herein, it is to be understood by those skilled in the art that this description is made only by way of example and not as a limitation as to the scope of the invention. Other embodiments are contemplated within the scope of the present invention in addition to the exemplary embodiments shown and described herein. Modifications and substitutions by one of ordinary skill in the art are considered to be within the scope of the present invention.

1-20. (canceled)

21. A system for determining a control signal for controlling the delivery of a fluid in a medical device, the system comprising:

- a plurality of analyte sensors, each analyte sensor generating an electrical signal at predetermined intervals; and
- a controller in communication with the analyte sensors and controlling the delivery of fluid by generating a control signal for a medical infusion pump, the controller comprising a processor,
  - wherein the analyte sensors send electrical signals to the processor in the controller and the processor in the controller correlates the electrical signals to a glucose value used in determining the control signal for the infusion pump, and wherein if the electrical signal from one of the analyte sensors differs by greater than a predetermined amount from the electrical signal from another analyte sensor, then the electrical signals from both analyte sensors are disregarded in determining the control signal for the infusion pump.

22. The system of claim **21**, wherein one of the plurality of analyte sensors is calibrated differently from another of the plurality of analyte sensors.

23. The system of claim **21**, wherein if the processor does not receive an electrical signal from one of the plurality of analyte sensors, the processor disregards future electrical signals from that analyte sensor in determining the control signal for the infusion pump.

24. The system of claim **21**, wherein each of the plurality of analyte sensors are tuned to a different dynamic range.

25. The system of claim **24**, wherein one of the analyte sensors is tuned wherein it is sensitive to low blood glucose levels.

26. The system of claim **25**, wherein one of the analyte sensors is tuned wherein it is sensitive to high blood glucose levels.

27. The system of claim **21**, wherein each of the plurality of analyte sensors has a different predetermined interval.

28. The system of claim **21**, wherein the predetermined amount is greater than 6%.

29. The system of claim **21**, further comprising an inertial measurement unit, the inertial measurement unit generating an electrical signal and wherein the controller uses the electrical signal from the inertial measurement unit in determining the control signal for the infusion pump.

30. The system of claim **21**, further comprising a heart rate sensor, the heart rate sensor generating an electrical signal and wherein the controller uses the electrical signal from the heart rate sensor in determining the control signal for the infusion pump.

31. A method for determining a control signal for controlling the delivery of a fluid in a medical device, the method comprising:

- providing at a plurality of analyte sensors;
- providing a controller, the controller comprising a processor and in communication with the plurality of analyte sensors, generating at predetermined intervals an electrical signal from each analyte sensor;
- receiving the electrical signals at the controller;
- comparing the electrical signals;
- determining a control signal for an infusion pump, wherein if the electrical signals from the analyte sensors differ within a predetermined amount then using the electrical signals in determining the control signal, and if the electrical signals from the analyte sensors differ outside a predetermined amount, disregarding the electrical signals in determining the control signal for the infusion pump.

32. The method of claim **31**, further comprising calibrating the plurality of analyte sensors differently from each other.

33. The method of claim **31**, further comprising if the processor does not receive an electrical signal from one of the plurality of analyte sensors, the disregarding future electrical signals from that analyte sensor in determining future control signals.

34. The method of claim **31**, further comprising tuning the plurality of analyte sensors to different dynamic ranges.